

1/12/05

GELATIN SUBSTITUTION PRODUCTS AND APPLICATIONS IN THE  
FIELD OF FOODS

The present invention relates to a gelatin substitution product and its applications, in particular in the field of foods.

After the emergence of bovine spongiform encephalopathy, utilization of gelatin in culinary preparations continues to be controversial. In addition, the inventors, pastry professionals, have noted that gelatin especially has the following drawbacks: certain types of gelatin have a flavor; moreover, the desired solidified product often has a rubbery texture; in addition, the pastry chef's work area definitively and directly influences the microbiology of gelatin. This is in fact often manipulated with the bare hands, which poses certain hygienic problems due to its reactivity.

The work of the inventors has led them to discover a novel substitute product that responds more satisfactorily to the requirements of the consumer and which is free especially of any suspicion relative to food hygiene.

The invention thus relates to a gelatin substitute product as well as to the process for incorporating it with other ingredients for producing a culinary preparation.

5 More particularly, the invention proposes a gelatin substitution product characterized in that it contains essentially a vegetable fat.

"Essentially" is defined as at least 99 % of vegetable fat. In particular, the substitute according to the invention can be comprised of 100 % vegetable fat.

It more particularly relates to hydrogenated colza/rape seed oil, palm oil fractions and more especially cocoa butter. The preferred fats are in particular the solidified fats; that is, those fats that are solid at room temperature.

In particular, the fat materials proposed by the invention are comprised of at least 75 % palmitic, stearic and oleic acids and comprise a maximum of 1 % lauric acid. Preferably, the percent of the aforesaid fatty acids is at least 85 %. Such proportions make it possible to assure obtaining fats having a composition approximating that of cocoa butter. As is described in the following, the composition of cocoa butter provides it with a certain number of quite specific characteristics demonstrated by the inventors and, in particular, adequate for use as a gelatin substitution product.

The fat materials according to the invention do not have gellifying properties like gelatin. In contract, they have stabilization properties. The term

"gelatin substitute" is used to mean that the product is used in identical fashion, by replacing the gelatin, according to the following method :

- the cold product is introduced into the culinary preparation ; the preparation being heated to a temperature greater than 60 °C ;

- it is mixed until a uniform paste is obtained and preferably while the preparation is cooling ;

- it is allowed to cool to room temperature before being placed in the refrigerator.

According to another method of incorporation described below, the product can be heated to a temperature of 30 to 40 °C prior to incorporating it into the culinary preparation at this same temperature.

In contrast with gelatin, the product is not hydrated prior to incorporation. Its utilization is thus simpler. Furthermore, said gelatin hydration step was a critical step of the fabrication process because it comprised a significant risk of introduction of bacterial into the culinary preparations. In fact, gelatin is an excellent medium for bacterial development. The product according to the invention is thus also more hygienic.

The advantages of cocoa butter are numerous :

#### 1. Flavor

The finished products comprising cocoa butter as the gelatin substitute are fresher in the mouth than those prepared using gelatin ; this enhances taste, the natural flavors and the aromas of the other ingredients present in the preparation (for example, fruits in the case of a fruit mousse and crèmes, in general).

In addition, gelatin, in contrast with cocoa butter, utilizes the water of the food in order to gellify. By drying the foods in order to swell up with water, the preparations containing it become insipid.

5       The very good organoleptic qualities of cocoa butter as a gelatin substitute are also due to its excellent palatability (impression in the mouth). In fact, cocoa butter has a melting point at a temperature close to that of the mouth. As a result, in the mouth,  
10   the cocoa butter melts and produces a creamy taste. Such a feature originating in the specific composition of its fatty material. An excessively stearic fat produces a waxy effect in the mouth. In contrast, an excessively oleic fat produces an oily taste in the  
15   mouth. Now, cocoa butter, because of its specific composition, does not produce any of the aforementioned unpleasant effects.

Concerning the fats not having a composition approximating that of cocoa butter, J. Pontillon, in  
20   his book Cacao et Chocolat. Production, utilisation et caractéristiques (Lavoisier 1998) describes them as follows : "An indisputable drawback of these fats resides in the particularly unpleasant flavor that they can acquire and pass on to the product" : the flavor  
25   commonly called "soapy". [...] Cocoa butter has a place of its own among the fatty materials since it can have an oleic acidity running up to 1.75 % while not being a drawback to taste, because its C16 and C18 acids are neutral from this point of view. On the other hand, for  
30   the majority of the other fatty materials, particularly the refined ones, the free acid does not exceed 0.10 %.

This is absolutely necessary for the fats containing high quantities of lauric acid and shorter acid, because, in the free state, these acids have very pronounced tastes ranging from a soapy impression to flavors tending towards the butyric (rancid butter) the more the fatty chain is shortened. Consequently, the least introduction of lipases resulting in chain shortening results in a significant deterioration in taste.

## 10        2. Texture

Gelatin confers to the preparations a rather elastic or rubbery foam-like texture which gives the preparation an artificial characteristic. Cocoa-butter based preparations on the other hand produce a pleasantly smooth, creamy texture comparable to that of a high quality yogurt.

## 3. Visual Aspect

With regard to the utilization of gelatin, the cocoa-butter based substitution product makes it possible to obtain a color that is closer (more natural, authentic) to other ingredients used in the culinary preparation. The final appearance of the preparations is more brilliant.

## 4. Health

25        Cocoa butter has very good nutritional qualities without producing hypercholesterolemia.

Furthermore, with regard to the other solid fats, it does not contain fatty acids of the trans configuration. In fact, these fatty acids appear at the type of hydrogenation of fatty materials (bio-hydrogenation for the milk fat materials, partial

hydrogenation for the vegetal fat materials). Now, as a result of the studies on the utilization of these fats and their impact on health, certain countries are studying legislative propositions consisting in  
5 limiting the level of these fatty acids in food products.

#### 5. Natural Character of the Product

The gelatin substitute comprised of cocoa butter is a natural product issuing from the cocoa bean. Cocoa  
10 beans can provide good traceability. Advantageously, the substitute according to the invention is comprised of 100 % cocoa butter.

In addition, cocoa butter is one of the rare vegetable fat materials that is naturally solid at room  
15 temperature. In fact, the other solid type fats are obtained by fractionating (for example, palm oil or palm kernel oil) and / or hydrogenation (palm kernel oil, copra oil). These steps require the introduction of additives or chemical products such as catalysts  
20 (e.g., Raney nickel for hydrogenation). These fats are, moreover, the cause of discoloration. Cocoa butter used as a gelatin substitute do not contain a trace of chemical reagents due to this type of transformation.

All of these advantages make cocoa butter the  
25 product of choice for use as a gelatin substitution product.

The substitute according to the invention can be incorporated very easily into mixtures. According to one preferred embodiment of the invention, the cocoa  
30 butter used as a gelatin substitute is present in the form of a powder. One such presentation makes possible

an instant and uniform source of substitute as well as very precise dosing of the product. Its use is thus simple, fast and precise. The powder form of cocoa butter can be obtained, for example, by cryoengineering  
5 of cocoa butter. One such method is described in application N° EP 0934110.

According to another embodiment, the substitution product according to the invention may contain additives such as lecithins and other emulsifiers,  
10 antioxidants in proportions ranging from 0 to max. 1 %.

According to the applications considered, the substitution product can be deodorized to 90 - 95 %. For example, the method described in Figure 1 can be used. As indicated in the diagram, this step does not  
15 change the natural character of the product at all, since it comprises heating with injection of water steam.

For other applications, it would be useful to conserve the taste of the cocoa butter by initial  
20 hydraulic pressure.

In this latter instance, it is interesting to report that the undeodorized cocoa butter is more resistant to oxidation over time.

The invention also proposes a method for  
25 incorporating the substitution product according to the invention, characterized in that said product is melted at a temperature of 30 to 40 °C prior to being incorporated into the ingredients for a culinary preparation.

30 Alternatively and more particularly, when the substitute is present in the powder form, it can be

incorporated directly into the preparation when the latter is heated to a temperature above 60°C.

Whatever the method of incorporation used, it is preferable to regularly mix the preparation during  
5 cooling in order to obtain a uniform mixture.

In the field of confectionery-catering, it is preferable that the culinary preparation has a humidity of less than 70 % prior to incorporation of the substitute according to the invention. Ideally, the  
10 humidity should be around 40 % to 50 %. Such a humidity makes it possible to obtain a preparation that is perfectly stabilized without being hard. It will be clear to the specialist in the art how to adapt his recipe by increasing the dry ingredients or the  
15 humidity as a function of the desired hardness.

Advantageously, for fruit mousses, it is recommended that a third of the fruit pulp be heated to approximately 60 - 80°C and then adding the substitute product according to the invention, mixing and then  
20 incorporating the rest of the cold pulp in order to obtain rapid cooling to room temperature. However, too rapid cooling, for example, by placing the mixture in the refrigerator, is strongly discouraged.

The quantity of substitution product will be  
25 chosen as a function of the preparation to be produced.

In particular, the cocoa butter will be advantageously incorporated with a quantity equal to two to four times the quantity by weight of gelatin usually used in the culinary preparation.

30 The substitution product can be used by replacing the gelatin in all kinds of culinary preparations and



more particularly in the production of confections up to 180°C.

The following preparations are mentioned by way of example : terrenes, fruit mousses, Bavarian crèmes, crèmes, bonbons, yogurts, dessert crèmes, lemon tarts, 5 pastry crème for eclairs, double-crème puffs, crème puffs, flans, rice pudding, crème cheese.

It should also be noted with interest that utilization of the substitution products of the 10 invention for making Kosher preparations.

The different aspects of the invention will be better understood from the following examples 1 to 9 given by way of illustration.

15 Example 1 : Raspberry Mousse

Raspberry Mousse (Cocoa Butter)		
Heat to 30°C	300 g	Raspberry pulp
with	175 g	Caster sugar
add	55 g	Cocoa butter
		melted at 30 - 32 °C
At 30°C add	650 g	Whipped single cream
Raspberry Mousse (Gelatin)		
Heat to 30°C	300 g	Raspberry pulp
with	175 g	Caster sugar
add	22 g	Hydrated gelatin sheets
At 30°C add	650 g	Whipped single cream

The recipe is identical for obtaining strawberry, blackberry, wild strawberry, apricot, passion fruit, morello cherries, wild berry and other mousses.

5 Example 2 : White Chocolate Satin Crème

White Chocolate Satin Crème (Cocoa Butter)

Make a pastry crème using

200 g	Whole milk
20 g	Caster sugar
20 g	Crème powder
50 g	Egg yolk
1 pod	Vanilla

After cooking, add

130 g	Satin white chocolate
-------	--------------------------

and 10 g Cocoa butter

At 30°C add 300 g Whipped single  
cream

White Chocolate Satin Crème (Gelatin)

Make a pastry crème using

200 g	Whole milk
20 g	Caster sugar
20 g	Crème powder
50 g	Egg yolk
1 pod	Vanilla

After cooking, add

130 g	Satin white chocolate
-------	--------------------------

and 4 g Cocoa butter

At 30°C add 300 g Whipped single  
cream

Example 3 : Praline Crème

Praline Crème (Cocoa Butter)		
Boil	130 g	Syrup at 30°C
Pour over	100 g	Egg yolks
Add	400 g	Praliné Tradition
		Lenôtre
and	18 g	Cocoa butter
At 30°C add	530 g	Whipped single cream
Praline Crème (Gelatin)		
Boil	130 g	Syrup at 30°C
Pour over	100 g	Egg yolks
Add	400 g	Praliné Tradition
		Lenôtre
and	6 g	Cocoa butter
At 30°C add	530 g	Whipped single cream

Example 4 : Gianduja Mousse

Gianduja Mousse (Cocoa Butter)		
Prepare a pastry crème using		
	300 g	Whole milk
	50 g	Egg yolks
	20 g	Crème powder
	60 g	Caster sugar
	16 g	Cocoa butter
	180 g	Gianduja Plaisir
		melted at 30 - 32°C
	250 g	Whipped single cream

### Gianduja Mousse (Gelatin)

Prepare a pastry crème using

300 g	Whole milk
50 g	Egg yolks
20 g	Crème powder
60 g	Caster sugar
16 g	Cocoa butter
180 g	Gianduja Plaisir melted at 30 - 32°C
250 g	Whipped single cream

### Example 5 : Mousse for White Satin Chocolate Quenelles

#### Mousse for White Satin Chocolate Quenelles (Cocoa Butter)

Prepare a pastry crème using

200 g	Whole milk
40 g	Caster sugar
60 g	Egg yolks
20 g	Crème powder
15 g	Caster sugar
1 pod	Vanilla
400 g	White Satin Chocolate
60 g	Cocoa butter
900 g	Whipped single cream

Example 6 : Mousse using a Fruit Pulp Pastry Crème Base

	600 g	Pulp
	150 g	Caster sugar
	20 g	Egg yolk
5	55 g	Whole eggs
	40 g	Cocoa butter powder
	600 g	Whipped single cream

Proceed as for a pastry crème using fruit pulp ;  
add the cocoa butter, cool to 30°C, then add the  
10 Whipped single cream.

Example 7 : Black Currant Mousse

	300 g	Black currant pulp
	175 g	Caster sugar
15	60 g	Cocoa butter powder
	650 g	Whipped single cream

Heat a third of the pulp with the sugar to 70°C ;  
add the cocoa butter. Mix well. Then add the remaining  
pulp at 3°C.

20 Cool to 18°C ; then incorporate the well whipped  
single cream.

The recipe can be used with blackberry pulp and  
cherry pulp.

25 Example 8 : Wild Strawberry and Blackberry Bavarian  
Crème

	250 g	Wild strawberry pulp
	100 g	Puréed blackberries
	200 g	Caster sugar
30	60 g	Egg yolks
	80 g	Cocoa butter powder

750 g Whipped single cream

Bring the wild strawberry pulp and the blackberry purée to a boil ; pour it over the previously mixed sugar and the egg yolks. Cook at 85°C, strain through a chinois and add the cocoa butter ; cool to 18°C and add the well whipped single cream.

Example 9 : Tart Crème and Lemon, Orange, Passion Fruit or Mandarin Orange Dessert

10	250 g	Pulp
	250 g	Caster sugar
	200 g	Whole eggs
	200 g	Egg yolks
	200 g	Milk butter
15	150 g	Cocoa butter powder

Bring the pulp to a boil ; pour over the previously mixed eggs, the egg yolks and the sugar and cook at 85°C in the microwave or the double-boiler ; add the milk butter and the cocoa butter ; cool.

20